Hadronic Dark Matter Searches at CMS at $\sqrt{s} = 13 \text{ TeV}$

Subtitle

By

ESHWEN BHAL



School of Physics University of Bristol

A dissertation submitted to the University of Bristol in accordance with the requirements of the degree of DOCTOR OF PHILOSOPHY in the Faculty of Science.

APRIL 2020

Word count: number in words

ABSTRACT

H ere goes the abstract

DEDICATION AND ACKNOWLEDGEMENTS

H ere goes the dedication.

AUTHOR'S DECLARATION

declare that the work in this dissertation was carried out in accordance with the requirements of the University's Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

TABLE OF CONTENTS

	P	Page
Li	ist of Tables	ix
Li	ist of Figures	хi
1	Introduction	1
	1.1 Section	1
	1.1.1 Subsection	1
A	Appendix A	5
Bi	ibliography	7

LIST OF TABLES

TABLE

LIST OF FIGURES

FIG	URE	Page
1.1	Hair-forming mutant cells	2
1.2	Developmental zones of an Arabidopsis root	3

INTRODUCTION

Begins a chapter. Example: When the beloved cellist (Christopher Walken - outstanding) of a world-renowned string quartet receives a life-changing diagnosis, the group's future suddenly hangs in the balance: suppressed emotions, competing egos and uncontrollable passions threaten to derail years of friendship and collaboration. Featuring a brilliant ensemble cast (including Philip Seymour Hoffman, Catherine Keener and Mark Ivanir as the three other quartet members), it is a fascinating look into the world of working musicians, and an elegant homage to chamber music and the cultural world of New York. The music, of course, is ravishing (the score is the work of regular David Lynch collaborator Angelo Badalamenti): A Late Quartet hits all the right notes.

1.1 Section

Begins a section.

1.1.1 Subsection

Begins a subsection.

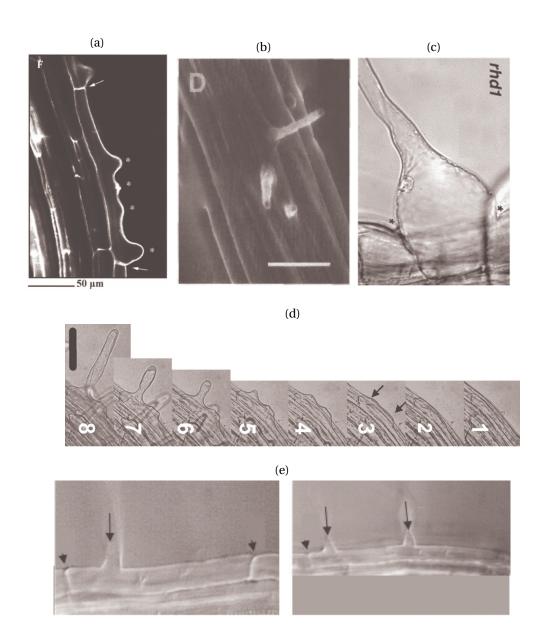


FIGURE 1.1. (a) A mutant RH cell. Asterisks show multiple sites of RH initiation in a single root hair cell (indicated by the arrows). Figure reproduced from [?]. (b) Hair-forming cell with three RH initiation locations. The bar represents $50\mu m$. Figure reproduced from [?]. (c) Large bump in mutant rhd1. Figure reproduced from [?]. (d) Mutant overexpressing gene ROP2; from right-hand to left-hand, numbers indicate progressive snapshots at different times. RH initiation sites are indicated by the arrows. The bar represents $75\mu m$. Figure reproduced from [?]. (e) Mutants affected by auxin. On the left-hand side, RH site is farther away from the apical end (left arrow cap); on the right-hand side, multiple RH locations (arrows). Figure reproduced from [?].

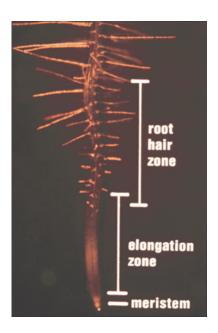


FIGURE 1.2. Developmental zones of an Arabidopsis root. Figure reproduced from [?].

Doing the same to check both sides of the paper (for when it's bound).



APPENDIX A

R egins an appendix

BIBLIOGRAPHY